

**NAVAL GUNFIRE SUPPORT TO  
AMPHIBIOUS OPERATIONS ACROSS  
THE SPECTRUM OF CONFLICT**

**A MONOGRAPH  
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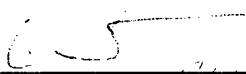
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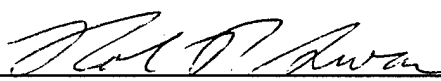
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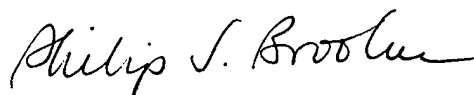
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## ABSTRACT

Naval Gunfire Support to Amphibious Operations Across the Spectrum of Conflict. by Major Rob B. McClary, USMC.

The United States' strategic environment has changed drastically in the past ten years. As a result of numerous, complex factors, the United States carried out a significant redeployment and retrenchment of its military forces. Ironically, as the United States reduced and withdrew its military forces, the threats to national security have become more numerous and more uncertain, thereby increasing the need for the United States to maintain a capability to project power across the oceans.

This paper uses three illustrative scenarios in which amphibious forces perform missions representing the spectrum of conflict, to determine the amphibious forces' requirements for support. The capabilities of naval gunfire assets are then determined and compared against the support requirements to determine if their capabilities meet the requirements. Where the capabilities fall short of meeting the requirements, the capabilities of other supporting agencies are then examined to determine if other agencies can compensate for the shortfalls of naval gunfire. Finally, the net shortfalls and their impact on the abilities of the NCA and Unified Commanders to achieve the national security objectives are determined.

This monograph shows that the current naval gunfire assets cannot support amphibious operations across the spectrum of conflict. As a result of their insufficiency, the capabilities of United States amphibious forces are significantly degraded. They cannot adequately conduct a conventional amphibious assault against a defended beach, and accept much greater risk while conducting missions at the lower end of the spectrum of conflict.

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## **Chapter I: Introduction**

### **Changes in the United States' Strategic Environment**

Changes in the United States' strategic environment, national interests, fiscal priorities, and global economic ties have greatly increased the need for the United States to maintain the ability to project military power across the oceans. When the Soviet Union collapsed, the United States was left as the world's lone superpower. Without the requirement to defend Western Europe against the potential Soviet invasion, the United States commenced a significant military retrenchment and redeployment to bases within the continental United States.

The United States strategic redeployment, however, did not coincide with a decrease in world-wide conflict. On the contrary, as author Robert Kaplan points out in his book, The Ends of the Earth, tribal and ethnic-based conflict rages throughout the world.<sup>1</sup> Demographics demonstrate a global migration to cities, producing a greater competition for resources. Without the strategic backdrop of the bipolar struggle for control between democracy and communism, there is an increase in conflict and competition for regional power. The Department of Defense (DOD) Joint Strategy Review in 1996 concluded that,

"The 21st century security environment will be categorized by chaos, crisis, and conflict. The causes of conflict will be complex and dynamic- political ideology, religious animosity, proliferation of weapons of mass destruction, and competition for scarce resources. All are potential threats to national interests. The epicenter of instability will likely be the world's littorals, where well over half of the world's population lives, and over three-quarters of the world's cities thrive. Sea lines of communication and maritime choke points will increase in strategic importance."<sup>2</sup>

The United States' national interests have changed, in the absence of a peer rival. The Clinton administration includes "responding to violations of human rights," "responding to natural or manmade disasters," and "promoting sustainable development" as situations in which the United States may use military force.<sup>3</sup> Additionally, increases in multinational corporations, foreign investments, and dependence on foreign nations for natural resources and labor have produced a world-wide economic interdependence. The United States' economy can be adversely affected by heretofore unimportant developments such as civil chaos in a third world country or market collapse in a developing country. These significant external changes are not the only changes affecting the United States.

The United States was simultaneously undergoing significant internal changes. For a variety of complex reasons, the conclusion of the cold war and the US victory in Southwest Asia precipitated a change in US defense spending. The Department of Defense went forward with a fiscal baseline significantly less than the budgets of the cold war, and planned for no future increases. The result was manifested in reduced capabilities in all areas, including end strength, systems and procurement.

Clearly there is an inconsistency present. At a time when the threats to US national interests are growing more uncertain, and the situations in which the National Command Authority (NCA) may choose to intervene militarily are increasing, military capabilities are decreasing. Given this situation, it is imperative to examine and understand the requirements for various military

capabilities, and the relative utility of the various forces which the President may call upon.

### **The Criticality of Naval Power**

The United States has always been, and still remains a maritime nation. An overwhelming majority of its international trade is conducted over the ocean. Unfettered access to trade routes and foreign markets are vital to the nation and its interests. When these are challenged, as in the case of the reflagging of the Kuwaiti oil tankers during the Iran-Iraq war, the US must respond. Additionally, the preponderance of all US security concerns lie overseas. It logically follows that in order to accomplish the diverse objectives of the National Security Strategy (NSS), the US must possess the ability to move the appropriate, capable forces to the required area, employ them in a timely manner, and sustain them throughout their operation. Naval forces offer the National Command Authority just that capability.

Naval forces provide the NCA a full range of military options to achieve political ends. The presence of a carrier battle group or an amphibious task force off shore can often achieve the national objectives through armed "suasion"; either persuading a potential ally to cooperate or dissuading a potential adversary from taking unwanted action. If presence alone proves insufficient, naval forces offer capabilities which cover the spectrum of conflict.



Naval forces can provide humanitarian assistance and disaster relief to peacekeeping operations, strategic strike, and forced entry. Their ability to be forward deployed and loiter in international waters give them an unmatched responsiveness, flexibility, and utility in a crisis.

Naval forces are also vital to operations in high-intensity conflict. They can perform missions including providing strategic and operational mobility to forces, isolating and depriving enemies of maritime commerce, and conducting strategic strike and operational maneuver to seize key terrain and facilities and facilitate the build up and sustainment of both land and air power in the theater of conflict.

Obviously the United States, given its strategic position and wide and varied national interests, relies heavily upon naval power. Many of the missions which the NCA requires naval forces to perform call for placing troops ashore. These missions, ranging from humanitarian assistance and disaster relief to the seizure of key terrain or facilities in high intensity conflict, require the physical presence of troops ashore. Consequently, the Navy must be able to effectively put Marines ashore and support them throughout designated operations. This capability for conducting amphibious operations, landing forces from ships to a potentially hostile shore under any circumstances and for any mission, is critical to NCA's ability to achieve its diverse national security objectives.

## **Amphibious Operations' Requirement for Naval Surface Fire Support**

Amphibious operations date at least as far back as the Persian landing at Marathon, Greece in 490 BC.<sup>4</sup> Throughout their history they have offered the commander the opportunity for a high pay-off victory, but not without risk.

Amphibious forces are generally short of organic fire support, particularly in the form of mass indirect fire, such as artillery, and especially during their ship-to-shore movement. Historically, naval gunfire has been a significant part of the solution, providing the necessary fires in support of the amphibious forces.

During the Pacific island-hopping campaign in World War II the Allies amassed a fleet whose fire support was so powerful that General Kuribayashi, the commander of the Japanese forces at Iwo Jima said in a message to the Chief of his General Staff, "The violence of the enemy's bombardment are beyond description....The power of the United States Warships make every landing operation possible to whatever beachhead they like."<sup>5</sup> As a result, as the war progressed, the Japanese abandoned their tactic of defending at the water's edge, and the Marine and Army amphibious forces suffered far fewer casualties as they came ashore.

Conversely, ineffective naval gunfire has doomed amphibious assaults, as in the case of the British failed expedition to Cadiz in 1625 when their ship's guns fired "over two thousand rounds at the fort" yet inflicted "virtually no damage."<sup>6</sup> Naval gunfire's importance has not been limited to major amphibious assaults. In 1958 Marines landed in Lebanon at the direction of President Eisenhower to

establish stability to the Lebanese government and prevent a potential Syrian invasion. The situation was chaotic and despite being a stability operation under generally peaceful conditions. Had the Lebanese attempted to act on Sa'ib Salam's cries to "drive any American landings back into the sea,"<sup>7</sup> the Marines would surely have required supporting fires from the ships.

### **Naval Surface Fire Support Assets Reduced**

Today's amphibious forces can come ashore much faster using helicopter and air-cushioned landing craft, but their need of supporting fire from the ships remains just as great. However, the Navy's ability to provide naval surface fire support, gunfire and missiles in support of landing forces, has been significantly reduced. The retirement of the Navy's last battleships and their powerful sixteen-inch guns was only the most visible of the reductions in fire support assets. Including the decommissioning and retirement of both ships and support aircraft, the United States Navy and Marine Corps lost over half of their total fire support resources in the five years following the 1990 Gulf War.<sup>8</sup>

Amphibious forces need naval surface fire support to perform their missions across the spectrum of conflict. The subject question is therefore critical to the United States military's capability to achieve the NCA's objectives. This paper examines and answers the question, **"are the naval gunfire assets sufficient to support United States' amphibious forces?"**

## **Chapter 2 : Background**

### **The Requirement for Naval Forces and Capabilities**

The United States is a maritime nation with varied and dispersed interests around the world. The 1998 National Security Strategy (NSS) recognizes the implications of protecting the United States, diverse and widely dispersed national interests and calls for “maintaining a substantial overseas presence” to promote regional stability by signaling commitment. The NSS also states:

“equally essential is effective and efficient global power projection, which is the key to the flexibility demanded of our forces and ultimately provides our national leaders with more options in responding to potential crisis and conflicts. Being able to project power allows us to shape, deter, and respond even when we have no permanent presence or a limited infrastructure in the region.”<sup>9</sup>

Naval forces provide the NCA and the Commanders In Chief's of the unified commands the ability to project power, and “shape, deter, and respond” in order to accomplish the diverse national security objectives around the world.

Naval forces provide the NCA a unique and unparalleled means to shape the strategic environment through the physical presence and visibility of force which the fleet provides at sea and in port visits. Additionally, through the conduct of exercises and operations, unilateral, bilateral or multilateral training exercises, both at sea and ashore, the CINC's can demonstrate American power, strategic mobility, and operational reach, thereby influencing the actions of nations around the world.

This demonstration of power not only provides support and assistance and encourages mutual cooperative behavior on the part of the US' friends, but it can also deter aggression on the part of potential adversaries. The flexibility and responsiveness of naval forces enables the NCA to send a carrier battle group and/or amphibious task force to the vicinity of a potential conflict, and from international waters deter acts of aggression.

No amount of force can or will deter all acts of aggression. Further, in the chaotic strategic environment which the US finds itself, it is difficult, if not impossible, to predict the exact nature of the crisis or conflict. The NCA therefore requires the means to rapidly respond to a wide variety of crises and situations. Naval forces provide this capability.

Naval forces' inherent mobility and ability to deploy around the world and loiter in the vicinity of potential provide them the responsiveness which the NCA and the CINC's require. Additionally, their ability to respond to crises across the spectrum, from humanitarian assistance and disaster relief to strategic strike and forced entry, provide the CINC's the flexibility they require to achieve the NCA's strategic objectives. With well over half of the world's population and over three quarters of the world's economic and population centers located in the littorals, naval forces provide the means to respond in the majority of the potential areas of crisis.<sup>10</sup> Clearly, the ability of the NCA to accomplish the objectives set forth in the NSS require the United States to maintain strong naval capabilities.

## **The Requirement for Amphibious Forces and Capabilities**

Inherent in the requirement for strong naval capabilities is the requirement to be capable of effectively putting troops ashore, under any condition for a variety of missions. Missions ranging from peacekeeping and peace enforcement to forced entry and the prosecution of major theater war can not be effectively performed without the physical presence of troops ashore.

In effect, there are two methods to put forces onto foreign ground to perform these missions; across the ocean or through the air. These two methods are complimentary capabilities, and therefore both should be available to the NCA. Still, a comparison of the two, utilizing the NCA's requirements drawn from the NSS of "capability, flexibility, responsiveness, and sustainability" demonstrates the criticality of maintaining the US' amphibious capability.

Capability: The ability to achieve the desired effect. Both means of deploying forces, by amphibious means and through the air, forces can accomplish assigned missions up to forced entry and prosecution of major theater war. During Operation Urgent Fury, October 25-31, 1983, both amphibious and airborne forces were used when President Ronald Reagan directed an attack against the Grenadian Peoples' Revolutionary Army and their Cuban Advisers and militiamen to ensure the safety of American citizens and prevent the establishment of a pro-Cuban regime. On 20 October, while already two days into their cross-Atlantic journey to the Mediterranean Sea, an amphibious squadron with an embarked Marine

amphibious unit (MAU)\* was redirected to participate in the attack on Grenada. On 25 October, the MAU conducted an amphibious attack, quickly secured its objectives on northern Grenada, and subsequently assisted the airborne forces which had become bogged down on the southern side of the island during their build-up of force at the St. Georges Airport.<sup>11</sup>

Flexibility: The Ability to respond and adapt to new and changing situations The flexibility of amphibious forces stems from their ability to task organize prior to deployment or while embarked, creating the precise combination of ground combat, air combat, and combat service support forces which offer the commander the greatest capability and advantage to accomplish any mission assigned. The value in this ability to task organize, and subsequently change the task organization as the situation or political objectives change, can be seen in the United States' intervention into the Dominican Republic in 1965.

In April 1965, the chaotic political situation in the Dominican Republic erupted in fighting between the factions vying for control of the country. The Johnson administration was determined not to allow the Dominican Republic to become "another Cuba." With initial objectives of protecting American citizens and interests in the Dominican Republic and demonstrating American support for free elections, the Johnson administration sent a naval force composed of surface ships with an embarked Marine amphibious unit (MAU) to the waters off of the coast of the Dominican Republic. From 28 to 30 April, while the United States'

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\* The title Marine Amphibious Unit was changed Marine Expeditionary Unit in 1988.

declared neutrality, the Marines conducted a noncombatant evacuation operation, evacuating over 1000 civilians, and reinforced the Marine security detachment at the US Embassy.<sup>12</sup>

As the situation changed the Johnson administration became increasingly concerned that the 'Constitutionals' faction would gain political control and establish a communist government. In order to prevent this, the remaining Marines and equipment of the MAU came ashore with tanks and 106-mm recoilless rifles and began establishing a secure corridor between the warring factions.<sup>13</sup> The Marine force had demonstrated the ability to quickly make the transition from a peacetime mission of a NEO to combat actions.

Responsiveness: The ability to react within the time frame dictated by the situation. While amphibious forces and air-delivered forces are both responsive, only amphibious forces can "loiter" in the vicinity of a potential conflict. This ability to remain in international waters, prepared to take action without requiring overflight rights, special treaties or international agreements provide naval forces with an unmatched responsiveness as demonstrated during Operation Blue Bat, the US intervention into Lebanon in 1958.

On 14 July, 1958, after receiving a special request from Lebanon's President Chamille Chamoun, US President Dwight D. Eisenhower ordered a military intervention aimed at reestablishing stability of the elected government of Lebanon to prevent a Syrian invasion. Amphibious forces were already headed to the eastern Mediterranean Sea as the situation developed, thereby offering the



President great responsiveness when he decided that intervention was required. By the 16th, over 3,000 Marines were ashore and prepared to fight if necessary. However, it never became necessary, most likely due to their rapid response. Airborne forces also played a part in Operation Blue Bat, but due to limitations of air facilities and aircraft, were much less responsive. To transport the initial Army task force units with 3,000 personnel, over 240 air missions were required.<sup>14</sup> Significant delays occurred because of overflight and staging problems. Contingency planners had assumed the political accession of overflight rights, yet during the crisis two friendly governments "felt obliged to restrict flights over their countries because of unanticipated political complications."<sup>15</sup> Moreover, long distance strategic moves of this magnitude require a reasonably secure and stable environment for the initial air deployments into the country. The presence of Marines ashore, with additional Marines and naval combat power afloat ensured such an environment. Having illustrated their capability, flexibility, and responsiveness, the paper now examines the organization and capabilities of US amphibious forces.

### **Amphibious Forces' Organization and Capabilities**

A Marine Air-Ground Task Force (MAGTF) is a task organized force made up of a command element, an aviation combat element, a ground combat element,

and a combat service support element. Although there are three typical MAGTF's, based around a Marine infantry division, regiment, and battalion respectively, a MAGTF could be formed with any combination of forces from the four basic elements.<sup>16</sup> Any specific MAGTF will be task organized according to the mission and threat, and therefore comprised of a mixture of ground, air, and support forces which give the commander the greatest capabilities and advantage over his enemy.<sup>17</sup> This organizational concept provides the MAGTF with great inherent flexibility.

At any given time, there are Amphibious Ready Groups (ARG) forward-deployed in the oceans around the world. These forces provide the Unified Commanders with capabilities, flexibility, and responsiveness offering a collection of options covering the entire spectrum of conflict.

These capabilities of amphibious forces, and in effect the options available to the Unified Commanders, have been adversely affected by the significant decrease in naval surface fire support asset. Naval surface fire support assets are one of the chief components of the amphibious forces, and during the military retrenchment a significant percentage of them were cut. The Navy has recently retired the last of its battleships, leaving only cruisers, frigates, and destroyers to provide fires in support of amphibious operations. None of these types of ships were designed to perform surface fire support as their primary mission, and as a result they all have limited effectiveness in this function. With only the Spruance (DD-963), Kidd (DDG-993), and Arleigh Burke (DDG-51) class

destroyers, and Ticonderoga class cruisers (CG-47) in the inventory, the U.S. Navy will have close to a total of 155 five-inch guns total with which to perform all missions, including fires in defense of the fleet and in support of amphibious operations. This is the U.S. Navy's smallest amount of naval gunfire assets, in both quantity and quality, this century.<sup>18</sup>

The fires which the Navy provides against shore targets with guns and missiles are collectively called "naval surface fire support" (NSFS). The Navy ships which doctrinally provide naval gunfire, the Spruance (DD-963), Kidd (DDG-993), and Arleigh Burke (DDG-51) class destroyers, and Ticonderoga class cruisers (CG-47) are all equipped with the Mark 45, 5-inch, 54-caliber gun.<sup>19</sup> The Mark 45 has a range of 13 nautical miles and a rate of fire of 16-20 rounds per minute.<sup>20</sup> Each ship's magazine typically holds about 500 5-inch rounds, including the anti-ship ammunition carried for self-defense. At sea replenishment is available, but requires time and planning.

To improve the range of their gunfire, the Navy is converting some existing Mark 45's from 54-caliber barrel (the barrel's length being 54 times its 5-inch inside diameter, or 22.5 feet) to a 62-caliber (25.8 feet long) barrel.<sup>21</sup> This new barrel will support the firing of the Extended Range Guided Munition (ERGM), which delivers 72 submunitions, guided by Global Positioning Satellites to a range of 63 nautical miles.<sup>22</sup> The ERGM will be fired in a similar manner as conventional rounds. Three seconds after being fired it deploys its wings, determines its position relative to its target through

GPS, and burns its rocket motor for 15 seconds.<sup>23</sup> The EX-171 ERGM submunition is a slightly modified version of the Army's XM-80 artillery round, and is designed for use against "soft targets" such as troops and lightly-armored vehicles.<sup>24</sup> It has GPS guidance, giving it an outstanding accuracy (Circular Error Probable of 20m at maximum range). It also has a variable pattern of submunition delivery, with circles of diameter ranging from 20 to 100 meters.<sup>25</sup> The ERGM glides after its motor burns out, giving it a lengthy time of flight to its maximum range of over 7 minutes.

In addition to naval guns, the Navy has two basic land attack missile systems, the RGM/UGM 109 'Tomahawk' and the "Stand-off Land Attack Missile."<sup>26</sup> Originally developed to deliver nuclear weapons from submarines, the Tomahawk Land Attack Missile program's emphasis transitioned to an over-the-horizon precision strike capability in 1984. With the development and fielding of the TLAM-C and TLAM-D, the Navy acquired the ability to conduct long range precision strikes against fixed targets using single warheads and submunitions respectively.<sup>27</sup> The Navy has demonstrated the TLAM's ability to strike strategic targets in the Gulf War and subsequent punitive strikes against Iraq, Bosnia, Afghanistan, and Sudan with reported success rates of over 85%.<sup>28</sup> With navigational assistance from the Digital Scene Matching Area Correlator DSMAC, the TLAM-C and TLAM-D have CEP's of 6 to 10 meters, meaning that any given missile should impact within 10m of its target.<sup>29</sup>

Although there has been some improvement in both areas, the TLAM still has two significant drawbacks. First, their high cost limits the number which the Navy can afford. As with any resource in demand, this forces the employment decisions to be more centralized, and forces the 'users' to prioritize. As the Navy has said, "While Tomahawk block II, III, and IV have a littoral capability, their importance to the deep strike [strategic] mission may limit their availability for the shorter range coastal campaign."<sup>30</sup> By doctrine, targeting for the TLAM's will be done by the CINC or joint task force (JTF) level targeting board, which limits its availability to the MAGTF commander. The TLAM's second drawback is its lack of responsiveness. The TLAM requires precise targeting and programming, which in turn requires time and detailed intelligence.

The SLAM is a modified version of the Harpoon anti-ship missile which is initially guided by GPS and given terminal guidance by an aircraft. SLAM's launched from aircraft were used with limited success in the Gulf War against fixed Iraqi targets.<sup>31</sup> Based on that experience, the Navy is pursuing an improved version called the SLAM-ER which will have greater range and penetration ability.<sup>32</sup>

The Navy has also experimented and tested a naval version of the Army Tactical Missile System (ATACMS), the MGM-140 NTACMS. However, with no established schedule to continue the project, and apparently insufficient fiscal support, the Marine Corps can not count on support from any NTACMS,

with their potential long-range (75 nautical miles) anti-personnel and anti-armor submunitions in the near future.<sup>33</sup> In addition to these NSFS assets, there are other important sources of supporting fires which support the MAGTF.

The ground combat element (GCE) of the MAGTF will have some organic artillery. In many scenarios at the lower end of the spectrum of conflict, however, concerns such as the political need to avoid giving an overly-combative image, or chaotic situations ashore during crisis response may prevent the MAGTF commander from bringing artillery ashore. In amphibious assaults, the need to keep artillery out of the direct-fire engagement prevents the MAGTF commander from being his artillery ashore during the initial assault. As JP 3-02 states,

“Because of its capability to provide close and continuous fire support, along with its ability to mass fires rapidly on critical points, field artillery plays a major supporting role [in amphibious assaults.] Plans should provide for early landing and entry into action of landing force artillery units.”<sup>34</sup>

Reality, however, is that artillery will not be available in the early stages of an assault. The joint doctrine for amphibious operations states that, “by the time artillery is established ashore, the targets of the Amphibious Task Force (ATF) target list should, to a very large extent, have already been serviced.”<sup>35</sup> Even after the MAGTF establishes its artillery ashore, it is likely to be a limited amount as seen by the comparison between the artillery organic to Marine and Army divisions. The Marine division has 72 tubes of 155mm artillery, whereas the Army division has 288 tubes of 155mm or higher including

MLRS.<sup>36</sup> The MAGTF, however, also gets support from Marine and Navy aircraft in addition to its organic artillery.

The size and composition of the air combat element (ACE) of the MAGTF can vary, from a composite squadron to a Marine Aircraft Wing. The MAGTF commander will normally “own” the aircraft which is embarked on the amphibious ships, consisting of some mix of attack and transport helicopters and Vertical/Short Take-off and Landing (VSTOL) attack jets. Of these, the attack helicopters and attack VSTOL jets provide close air support. Attack helicopters can be armed with anti-tank guided missiles, miniguns, and rockets, and the VSTOL attack jets with an assortment of bombs.

The first priority of aircraft operating from the carrier battle group, whether Navy or Marine Corps, will be the defense of the Naval force. This could readily include strikes ashore against anti-shipping targets as well as defense against combat aircraft. As a result, anti-air Navy aircraft and Marine fighter and attack aircraft may not be available for the MAGTF commander’s use when the situation requires additional fire support.

This all places greater emphasis on naval gunfire to provide the required support for the amphibious forces across the spectrum of conflict. Are the naval gunfire assets capable of providing sufficient support? Considering the requirement for a flexible, responsive amphibious force, the criticality of naval gunfire to amphibious forces’ the success throughout history, and the reduction in naval gunfire assets, the question has serious implications for the United States’ ability to achieve its national security objectives. In the following chapter, this paper analyzes the assets available against the effects required

from NSFS during missions representative of the missions which the Unified Commanders may require of the amphibious forces.



### Chapter 3: Analysis

To answer the question posed in the introduction, this paper compares the capabilities of the NSFS assets to the MAGTF's requirements during three potential scenarios in which the NCA may require the MAGTF to operate.

These scenarios are:

- ① conducting a forced entry by conventional amphibious assault.
- ② conducting a noncombatant evacuation operation.
- ③ conducting a peacekeeping/peace enforcement mission.

These scenarios, while obviously not all-inclusive of those in which the NCA may require amphibious forces, are representative of the broad spectrum of conflict throughout which the US military forces must be capable of operating. For each of these representative missions, the MAGTF's requirements will be compared to the NSFS' assets to determine sufficiency or shortfall. Based on this sufficiency or shortfall, the NSFS assets will be evaluated against criteria for fire support characteristics and capabilities selected from Fleet Marine Force Manual 2-7, Fire Support in Marine Air-Ground Task Force Operations. The MAGTF's requirements for naval surface fire support in each of the representative scenarios will fall under the general categories of fires synthesized from the effects and purposes of fires as

described in FMFM 2-7. These categories are “shaping fires”, “destructive fires”, and “counterfires.” The category of shaping fires includes those fires whose purpose is to restrict enemy maneuver or facilitate the MAGTF freedom of maneuver. Destructive fires are those whose purpose is to destroy enemy forces or equipment, and counterfires are those fires whose purpose is to destroy or neutralize enemy weapons systems which are bringing effective fires against the MAGTF.

The four criteria used to evaluate the overall sufficiency of the NSFS assets are effectiveness, the ability to produce the desired effect, continuity, the ability to provide fires continuously as required by the situation, responsiveness, the ability to provide effects within the required time frame, and flexibility, the capability of producing different effects, and varying the effects as the situation requires.

### Scenario 1 : Conducting a forced entry by conventional amphibious assault.

Potential purposes for this mission include seizure of ports or airfields to facilitate a greater force build-up, or the defeat of enemy key forces and capabilities through operational maneuver. Key to these purposes is the concept of operational maneuver, with amphibious forces either seizing an objective which is vital to the joint force commander's plan or striking the enemy at a critical vulnerability. Consequently, the objective of the amphibious assault is not merely to "secure a beachhead."

Amphibious forces will always seek to avoid enemy strength, and under optimal conditions will be able to come ashore uncontested. However, circumstances may preclude the avoidance of resistance, and the MAGTF must therefore fight through the enemy to accomplish the overall purpose of the amphibious assault. Additionally, as mentioned earlier, due to the nature of forced entry operations, the amphibious forces start with no combat power ashore, and must build to full capability.

**Fires to Shape the Battlefield:** The MAGTF's requirement for shaping fires during the conduct of a forced entry can be illustrated by these representative tasks:

① Fix enemy defenses to prevent their maneuver and reorientation on the MAGTF's penetration. Marine forces conducting operational maneuver and maneuver warfare seek to defeat their enemies by operating at a higher tempo, and through deep maneuver forcing the enemy to expose a critical vulnerability which

can be subsequently attacked. One of the keys to this is retaining the initiative, and preventing the enemy forces from quickly and effectively reacting to the actions of the MAGTF. In amphibious assaults, where the defender possesses a significant tactical advantage, supporting frontal attacks conducted to fix the enemy's defenses and prevent their reorientation and displacement are not feasible due to the limited supply of landing craft, and the probable cost in casualties. Marine forces therefore require fires to fix the enemy defenses and prevent their reorientation and maneuver.

② Provide screening fires to facilitate the MAGTF's maneuver by blinding and disorienting enemy defenses. Screening fires are "fires using smoke projectiles to obscure the enemy's observation of friendly forces and their movement"<sup>37</sup> which augment destructive fires during an attack. The MAGTF's requirement for screening fires is increased due to the proliferation of cheap but effective mines. As Gatchell says in At the Water's Edge, "In spite of their relative simplicity, mines cause disproportionate problems for the attacker."<sup>38</sup> In fact, the presence of numerous inexpensive low-tech Iraqi mines were a major factor in the decision to not have the Marines conduct an amphibious landing during the Gulf War.<sup>39</sup> More recently, the militaries of the former Soviet Union has equipped such potential adversaries as China, Iran, Iraq and Libya with high-tech self-propelled and "smart" mines deployed by submarine.<sup>40</sup>

The ATF has limited mine-clearing assets. The MAGTF will obviously seek an unobstructed axis to attack along, but still must be capable of breaching obstacles. The ATF countermine systems, such as helicopters which drag mine-clearing devices in the water, are extremely vulnerable to enemy fire. To protect the breaching forces, the NSFS assets must be able to provide screening fires which blind the enemy in addition to destructive fires.

③ Shape the battlefield through the isolation of amphibious objectives or axes of maneuver. Beyond fixing the enemy in positions to prevent maneuver, isolation of objectives is critical to augment fixing fires and prevent the enemy from introducing reinforcements. This can be done through immediate fire missions or the establishment of obstacles with the Family of Scatterable Mines (FASCAM). Obstacles can deny maneuver options to the enemy, degrade his mobility, and slow his operational tempo allowing the MAGTF to act faster and gain advantage. FASCAM would allow the MAGTF to emplace obstacles at distant locations which have the greatest detrimental effect on the enemy.

**Evaluation:** The Mark 45's short range prevents it from being able to adequately support these requirements. As evidenced by the Gulf War, even where the United States and the coalition had uncontested air superiority, the ships with Mark 45's were kept at a distance away from the coast which

prevented them from providing fires in support of the ground forces. This left the now-retired battleships as the only providers of naval gunfire.<sup>41</sup> Because of this need to keep the ships providing NSFS outside of the range of the enemy's anti-ship missiles, the Mark 45 5-inch gun lacks the range, and therefore the effectiveness to meet the MAGTF's requirements. The ERGM has the range to reach the enemy from the doctrinal distance at sea, but still has shortcomings. Destroyers and cruisers have only two 5-inch guns each, and the frigates only one. The rate of fire of the ERGM is suitable for fixing and suppressing defenses, but the low volume of ammunition carried aboard each ship negates this capability. Each ship carries about 500, 5-inch rounds including the anti-ship ammunition carried for self-defense. Even if the majority of its rounds were smoke and HE for obscuring and suppressing enemy defenses, the ship would not be able to provide the continuous support required. While its accuracy and variable pattern of submunition delivery enable it to hit enemy defenses forces as arrayed in their defensive positions, the limited amount of guns which the Navy can arm with the ERGM and bring to bear<sup>42</sup>, coupled with the limited amount of ERGM ammunition which will be carried by each ship, preclude the massing and duration of fires necessary to fix the enemy front. The ERGM's therefore can not provide an adequate continuity of support to meet the MAGTF's requirements. Further, ERGM's have no capability to fire FASCAM mines or smoke rounds, and therefore lack the effectiveness to

sufficiently screen the MAGTF's maneuver forces or isolate amphibious objectives.

**Destructive Fires:** The MAGTF's requirement for destructive fires during the conduct of a forced entry can be illustrated by these representative tasks:

① Prevent counterattack against the MAGTF deep maneuver force by interdicting and destroying enemy mobile reserves, both armored and light-skinned. The enemy's mobile reserves, especially enemy armor forces, must be prevented from counterattacking the flanks of the deep maneuver force. The success of operational maneuver is dependent upon the MAGTF gaining and maintaining the initiative, and forcing the enemy to accept battle on terms which favor the MAGTF. The enemy reserves must therefore be prevented from striking the MAGTF in the flanks or rear.

② Paralyze the enemy, and degrade his ability to adapt by destroying enemy headquarters and command and control links. Neutralizing the enemy's headquarters and command and control links can prevent the enemy from effectively directing his forces and can enable the MAGTF to defeat him quickly without requiring the physical destruction of all of his forces.

**Evaluation:** The Mark 45's limited range again prevents it from providing the needed fires. It additionally lacks the capability to provide precision or massed anti-armor fires. For these reasons, the Mark 45 lacks the

effectiveness to meet the MAGTF's requirements. The ERGM possesses sufficient range, but lacks an anti-armor capability required to prevent enemy counterattack. Further, by current doctrine, each battalion-sized maneuver element can expect no more than one ship with one or two 5-inch guns in direct support. The ERGM therefore lacks the effectiveness to meet the MAGTF's requirement for the capability to destroy enemy armored reserve forces. The ERGM is capable of neutralizing enemy headquarters.

**Counterfires:** The MAGTF's requirement for counterfires during the conduct of a forced entry can be illustrated by these representative tasks:

① Prevent enemy artillery from massing on MAGTF maneuver forces by providing counterbattery fires. Enemy artillery is one of the most serious potential threats to the MAGTF's forces. Adversaries based on the organization tables of the former Soviet Union have notably robust artillery capabilities. Given the MAGTF's limited amounts of armor, massed fires from enemy artillery could be devastating.

② Protect MAGTF forces caught under enemy direct fires by providing Immediate Suppression fires. MAGTF forces are their most vulnerable during the ship-to-shore movement. The MAGTF therefore requires an effective and



responsive means of suppressing and preventing the enemy from bringing effective fires against the MAGTF during its ship-to-shore movement.

③ Facilitate the MAGTF's vertical envelopment, resupply, and close air support by suppressing enemy ADA systems (SEAD). MAGTF and other supporting aircraft require protection as they conduct attacks, assaults, and support missions. The air defense systems of the enemy must be suppressed for these missions to be successful.

**Evaluation:** For the reason of range discussed earlier, the Mark 45 5-inch gun lacks the effectiveness to provide the required counterfires. Due to its long time-of-flight, the ERGM lacks the responsiveness to provide the required immediate suppressive and counterbattery fires. The ERGM can provide adequate SEAD fires, where the SEAD mission will be preplanned, and therefore early firing can compensate for the round's lack of responsiveness.

Additionally, the lack of a capable ship-borne firefinding radar severely degrades the naval gunfire system's ability to provide responsive counterfires. Given the nature of forced entry operations, and building combat power ashore from zero, the MAGTF's organic firefinder radars may not be available during the initial stages of the operation. Due to the primary mission of fleet security, the AN/SPY-1 air surveillance radar on the Aegis platforms, which could perform this mission with slight modification, will not be available for use as a

firefinder radar for the MAGTF. Without such a radar system, the naval gunfire system lacks the effectiveness and responsiveness to meet the MAGTF's requirements for counterbattery fires.

In summary, the naval gunfire assets lack the effectiveness and continuity of support to provide sufficient anti-armor destructive fires. They lack the effectiveness and responsiveness needed to provide sufficient counterfires, and lack the effectiveness and continuity of support to meet the MAGTF's requirement for shaping fires. As a result of their lack of effectiveness, responsiveness, and availability, the naval gunfire assets are insufficient to meet the MAGTF's requirements during mission the conduct of a forced entry by amphibious assault.

Mission 2: to conduct a noncombatant evacuation operation. With the occurrence of ethnic and tribal conflict and the failure of national governments throughout the world, the Unified Commanders must be prepared to conduct operations to protect and evacuate American diplomats and citizens from chaotic and dangerous situations. Unlike the organized, well-equipped enemy which this paper assumed would oppose the assault, the enemy opposing a NEO will most likely be a relatively unstructured force. Recent NEO's conducted in Mogadishu and Monrovia demonstrate the typical chaotic and uncertain conditions and the military's need to maintain the capability to exert overwhelming force at any time. While the forces opposing the NEO may possess some technologically-advanced weapons, they will probably be equipped with mostly-primitive weapons.

The enemy opposing the MAGTF in a NEO will likely be an unorganized mass, possibly not in uniform, with an asymmetric disregard for casualties. Additionally, the situations requiring NEO's have the potential of developing quickly and chaotically, and the possibility of harm coming to American citizens will require immediate action. By their nature, NEO's do not lend themselves to build-ups of forces ashore, and the MAGTF therefore relies heavily on afloat support in all aspects.

**Fires to Shape the Battlefield:** The MAGTF's requirement for shaping fires during the conduct of a NEO can be illustrated by these representative tasks:

① Fix and suppress enemy defenses to prevent their orientation on and disruption of the MAGTF's NEO Once the enemy has been determined hostile, the MAGTF will require the ability to suppress enemy forces and prevent them from disrupting the NEO.

② Provide screening fires to facilitate the MAGTF's maneuver by blinding and disorienting enemy defenses. Screening fires can be exceptionally useful in the NEO environment, where it is likely that civilians will be in close proximity to the enemy forces, and the enemy forces will probably lack sophisticated thermal-vision optics capable of seeing through smoke. By blinding the enemy and screening the MAGTF forces performing the NEO, the effects of enemy fire on the MAGTF can be greatly reduced.

**Evaluation:** Mark 45 5-inch guns and ERGM's both lack the continuity of support to meet the MAGTF's requirement for sustained suppressive fires. Due to the rate of fire required to effectively suppress forces, and the limitations on the quantity of rounds stored in the NSFS ships' magazines, the

ships would require replenishment during the operation. While the Navy is capable of performing underway replenishment under most conditions, it still would interrupt the suppressive fires.

The naval gunfire assets are lack the effectiveness to provide screening fires. The Mark 45 5-inch gun does fire smoke rounds, but the 5-inch smoke rounds were designed for marking instead of screening, and thereby produce a limited amount of smoke. This, combined with the ships' limited magazine storage space, prevent the Mark 45 from achieving the continuity and effect required. The ERGM has no smoke-producing capability, and therefore lacks the effectiveness to meet the MAGTF's requirements for screening fires.

**Destructive Fires:** The MAGTF's requirement for destructive fires during the execution of a NEO can be illustrated by these representative tasks:

① Protect the MAGTF forces and the evacuees by delivering massed destruction fires against enemy troop concentrations. In chaotic environments characteristic of those situations requiring NEO's, the enemy will likely appear quickly, and in mass formations. While the enemy may possess unsophisticated weaponry, they may attempt to overcome their disadvantage in technology with a high level of passion, and an asymmetrical disregard for casualties.

② Paralyze the enemy, and degrade his ability to adapt by destroying enemy headquarters and command and control links. In some situations the

hostile force may possess a recognized headquarters, and operate with some degree of centralized control. In such scenarios, the MAGTF may seek to destroy the enemy command and control links, thereby preventing the enemy from directing its forces and coordinating its efforts.

**Evaluation:** This paper assumes that the enemy opposing the MAGTF's execution of a NEO does not possess an effective anti-ship capability, thus allowing the naval gunfire platforms to come sufficiently close to the coast to allow the Mark 45 5-inch gun to deliver fires. Additionally, this paper assumes that the NEO is conducted in the vicinity of the coast. In situations where these assumptions prove invalid, the Mark 45 again would be ineffective at all tasks.

The Mark 45 5-inch gun's high rate of fire enable it to provide the required destructive fires. However, because of the low trajectory of its rounds, it is limited to firing at targets in flat terrain, or on the front side of hills. In urban terrain, where one could expect most NEO's to be required, the Mark 45 5-inch gun would not be effective. The Mark 45 therefore lacks the flexibility to meet these requirements.

The ERGM has adequate range and can produce the desired destructive fires. Its precision guidance allows its use while minimizing collateral damage and civilian casualties. The ERGM is therefore sufficient to meet the MAGTF's requirements for these tasks.

**Counterfires:** Given the scenario, it is possible that the enemy may not possess effective indirect fire or air defense capabilities. In cases where the enemy does possess these capabilities, the MAGTF's requirement for counterfires during the conduct of a NEO can be illustrated by these representative tasks:

① Prevent enemy artillery from massing on MAGTF maneuver forces by providing counterbattery fires. Enemy artillery is one of the most serious potential threats to the MAGTF's forces. Even relatively-unsophisticated forces are likely to have artillery systems whose massed fire would be devastating to the NEO. In the chaotic environments which typify the situations in which NEO's are required, the enemy has the choice of whether or not to oppose the MAGTF. Because the NCA will make every attempt to have the US citizens evacuated without inflicting casualties, political restrictions will likely preclude conducting preparation fires.

② Protect MAGTF forces caught under enemy direct fires by providing Immediate Suppression fires. As in the case of an assault, MAGTF forces are their most vulnerable during the ship-to-shore movement. As discussed earlier, the adversary begins with the choice of permitting or contesting the evacuation, and therefore begins with the initiative. The MAGTF therefore requires a very

responsive and capable means of suppressing enemy forces which bring effective fires against the MAGTF as they execute the NEO.

③ Facilitate the MAGTF's execution of the NEO by suppressing enemy ADA systems (SEAD). The MAGTF's aircraft require protection as they insert forces and evacuate the noncombatants. The air defense systems of the enemy must be suppressed for these missions to be successful.

**Evaluation:** Assuming that the ships can safely come close to the shore, and that the NEO can be executed in the vicinity of the coast, the naval gunfire assets can provide adequate counterbattery fires. The Mark 45 5-inch gun can respond rapidly, with a high rate of fire. In situations which require precision or high-angle fire, the ERGM can provide the required effects. Further, under these circumstances, where the decreased gun-target distance allows it to travel under rocket motor and avoid gliding, the ERGM possesses a responsiveness which enables it to provide sufficient counterbattery as well as immediate suppression fires.

The extended range of artillery systems provides a problem to the naval gunfire assets. Unlike the requirements for counterbattery and immediate suppression fires, the need for SEAD fires requires the naval guns to range beyond physical location of the MAGTF forces. As a result of its short range and low-angle fire, the Mark 45 lacks the effectiveness required to adequately



provide SEAD fires. Due to its long time-of-flight at extended ranges, the ERGM's also lacks the responsiveness to adequately provide these fires.

In summary, the naval gunfire assets lack the flexibility, effectiveness, and continuity of support to provide the required destructive and shaping fires. Additionally, they lack the responsiveness and effectiveness to provide the required counterfires. As a result, the NSFS assets are insufficient to support the MAGTF in its execution of a noncombatant evacuation operation.

Mission 3: to conduct a peacekeeping/peace enforcement mission. The

occurrence of ethnic, tribal, and regional conflict throughout the world shows no sign of diminishing, and is possibly increasing. Even if the number of conflicts decreases, given the global economic interdependence and the world-wide, instantaneous media coverage, there will always be conflicts or potential conflicts which the US wants to control.

United States forces are currently performing peacekeeping missions around the world. While the US' forces normally participate as a contingent of a multinational or UN force, and therefore could theoretically receive support from another nation (such as the Pakistani forces provided in Somalia) this paper addresses only the MAGTF and United States forces.

The success of peacekeeping operations is largely contingent upon the two belligerents' reluctance to make an enemy of the peacekeeping force. Implied in this are the assumptions that the peacekeeping force, the United States in this case, is viewed by both adversaries as neutral to begin with, and that they both view the status quo as preferable to making the United States their enemy.

The complexity of these situations creates a dilemma for the peacekeeping forces: they must be prepared to fight without appearing belligerent. This political need to avoid creating a perception of aggression can result in the forces being in a tactically disadvantageous position when one of the belligerents attacks. Further, the political need to avoid belligerent

appearances may preclude the positioning of artillery ashore, thereby increasing the need for fire support from the ships.

**Fires to Shape the Battlefield:** The MAGTF's requirement for shaping fires during the conduct of a failed peacekeeping operation can be illustrated by these representative tasks:

**① Fix and suppress enemy defenses to facilitate the MAGTF's freedom of action.**

Once a peacekeeping mission fails, and the peacekeeping force is attacked, it must first defend itself. Political decisions will determine the subsequent strategy; withdraw or reinforce and fight to win. The fundamental concerns of the peacekeeping force, in this case the MAGTF, is to protect the force, and ensure freedom of action. To accomplish these, the MAGTF requires fires to fix and suppress enemy forces, enabling the MAGTF to maneuver at will, and either accept or decline battle.

**② Provide screening fires to facilitate the MAGTF's maneuver by blinding and disorienting enemy defenses.** By screening the MAGTF forces' actions, smoke prevents the enemy from gaining an accurate picture of MAGTF actions, and therefore reduces the enemy's ability to maintain the initiative. This helps the MAGTF regain freedom of maneuver.

③ Shape the battlefield by canalizing enemy forces. By reducing the enemy's mobility in chosen areas, FASCAM minefields delivered by fires can assist the MAGTF in shaping the battlefield, regaining the initiative, and conducting amphibious withdrawal or reinforcement as required.

**Evaluation:** Depending on the scenario, the enemy may be equipped with modern weapons including anti-ship missiles. In such cases, the ships would be forced to remain at a distance off-shore which would preclude the effective use of the Mark 45. This paper assumes that the enemy does not possess an anti-ship capability, and that the Mark 45 would therefore be able to range the enemy.

Even if in range, however, the Mark 45 5-inch gun lacks the ability to mass fires, and therefore the effectiveness required to meet the MAGTF's need for shaping fires. With only one or two guns per ship, depending on the class of ship, any given target will likely have one or two guns able to engage it. Even with its high rate of fire, it can not provide massed fires. Further, due to its low angle fire the Mark 45 lacks the flexibility to provide effective fires in The ERGM's submunitions provide an area coverage with one volley, but because it has no anti-armor capability it lacks the required effectiveness. As discussed earlier, the naval gunfire assets lack the capability to deliver FASCAM mines. While the Mark 45 has the capability to fire smoke rounds, and is capable of

marking, the 5-inch round produces insufficient smoke for screening. The naval gunfire assets therefore lack the effectiveness to meet the MAGTF's need for screening fires.

**Destructive Fires:** The MAGTF's requirement for destructive fires during the conduct of a failed peacekeeping operation can be illustrated by these representative tasks:

① Paralyze the enemy, and degrade his ability to adapt by destroying enemy headquarters and command and control links. As in the situation surrounding the NEO, the hostile force may possess a recognized headquarters, and operate with some degree of centralized control or he may be a disorganized mob. In scenarios where the enemy does have an identifiable command and control structure, the MAGTF may seek to destroy it. By doing so, the MAGTF can regain the initiative by preventing the enemy from directing its forces and coordinating its efforts.

② Prevent attack against MAGTF forces by destroying enemy forces. In this situation, the enemy may be equipped with modern weapons and systems like the forces of the former Yugoslavia, or they may be primitive like the Haitians. The NSFS assets must have the flexibility to produce fires which can destroy large tank formations, as well as disorganized mobs.

**Evaluation:** This paper again assumes that the force attacking the MAGTF during their peacekeeping mission does not possess an effective anti-ship capability. This would allow the NSFS platforms to come sufficiently close to the coast that the Mark 45 5-inch gun could deliver fires. Additionally, this paper assumes that the peacekeeping operation is conducted in the vicinity of the coast. As in the discussion of the NEO, if the situation existed where these assumptions were invalid, the Mark 45 would be unavailable for all tasks.

The Mark 45 5-inch gun's capabilities and limitations are as discussed during the section on the NEO. Its high rate of fire enable it to provide the effects required to accomplish both tasks, but the low trajectory of its rounds limits its effectiveness to firing at targets in flat terrain, or on the front side of hills. In urban terrain or broken terrain, the Mark 45 5-inch gun would not be effective. The Mark 45 therefore lacks the flexibility to meet these requirements. The ERGM has adequate range and can destroy enemy headquarters, but lacks the anti-armor capability to prevent enemmy counterattack.

**Counterfires:** The MAGTF's requirement for counterfires during the conduct of a failed peacekeeping mission can be illustrated by these representative tasks:

① Prevent enemy artillery from massing on MAGTF maneuver forces by providing counterbattery fires. As mentioned earlier, enemy artillery is one of the most serious potential threats to the MAGTF's forces. Even relatively-unsophisticated forces are likely to have artillery systems whose massed fire would be devastating to the MAGTF forces. Unlike the earlier scenarios, however, in the case of the failed peacekeeping operation the MAGTF should have reliable intelligence concerning the disposition of the enemy's artillery. With this, the MAGTF can strike and destroy the enemy artillery as soon as the enemy demonstrates his hostile intent.

② Protect MAGTF forces caught under enemy effective direct fires by providing Immediate Suppression fires. As in the case of the NEO, during peacekeeping operations the MAGTF forces operate under the assumption that the environment is, and will remain permissive. In the event that one side chooses to attack the MAGTF forces for whatever reason, the MAGTF forces must have access to responsive, effective supporting arms.

③ Facilitate MAGTF air operations by suppressing enemy ADA systems (SEAD). In a situation such as this, the MAGTF's aircraft may be called upon to perform a wide variety of missions, ranging from extracting the MAGTF forces to providing close air support and interdiction missions. The enemy's

air defense systems must be suppressed for each of these missions to be successful.

**Evaluation:** In situations where the enemy lacks an effective anti-ship capability, and the ships can therefore approach the shore, the Mark 45 possesses the responsiveness and effectiveness to provide SEAD fires. Once again, its low angle fire render it ineffective in all but flat terrain. The Mark 45 therefore lacks the flexibility required to meet the MAGTF's needs for counterfires.

The ERGM has the required range and effectiveness, but due to the limitations of magazine capacity, the naval guns still lack the capability to provide duration suppression. As a result, the naval gunfire assets lack the effectiveness and continuity of support needed to meet the MAGTF's requirements for counterfires.

In summary, the naval gunfire assets lack the flexibility and effectiveness to provide the required shaping fires, destruction fires, and counterfires necessary to support the MAGTF during a failed peacekeeping mission. This shortfall would become more severe should the enemy possess an effective anti-ship missile capability, which would force the naval gunfire platforms to remain so far off-shore that the Mark 45 5-inch gun would be ineffective.



## **Chapter 4: Conclusion**

Naval gunfire (NGF) assets have been shown to be inadequate to support the Marine Air-Ground Task Force in three separate scenarios representative of the entire spectrum of conflict. The Navy's reduction in the number of surface combatants has not been accompanied by a reduction in missions. The decrease in the number of naval guns available, including the last of the battleships' sixteen-inch guns, significantly reduced the effectiveness, flexibility, availability, and the continuity of support of naval surface fires. As shown in the analysis, the addition of the ERGM does not compensate for the significant loss of naval guns.

The NGF assets lack the required effectiveness in many areas; the ability to provide volume suppressive fires, the ability to destroy or neutralize enemy armor formations, the ability to shape the battlefield by delivering FASCAM mines or fixing enemy defenses, and the ability to protect the force by delivering screening fires. NGF assets also lack the required flexibility to engage targets in all terrain, and perform different missions as required by the dynamic situation. They also lack the required responsiveness provide the needed counterfires. Finally, under current doctrinal arrangements governing the number of platforms allocated to the naval gunfire mission in support of the

amphibious forces, they lack the required continuity of support required by the MAGTF as it performs all of these missions.

To compensate for these shortfalls caused by the reduction in naval gunfire assets, the Navy has added ship-to-shore missiles. Together with naval gunfire assets, the missiles and their systems form the naval surface fire support system.

While the Navy has greatly increased its ship-to-shore lethality with TLAM's, experiences in both exercises and combat show that TLAM's will not be available to the MAGTF commander for targeting and tactical missions. As mentioned earlier, the Navy itself believes that their cost (\$500,000 to \$1.5M)<sup>43</sup> and their resultant limited availability will restrict their use to strategic and deep targets nominated on the CINC's or JTF's targeting boards. Further, even with the improvements in programming, it still requires "hours" to ready a TLAM for its flight, thus rendering it ineffective against mobile targets in a dynamic environment.<sup>44</sup>

The SLAM-ER and the NTACMS are both currently unavailable. While each, if available would be of great use to the MAGTF commander, the US Army experience with ATACMS indicates that the preponderance of NTACMS support would be most likely reserved for the CINC or joint force commander's use. Even when fielded and available for the MAGTF commander's use, in their proposed form they lack the capability to deliver suppressive fires, screening fires, and FASCAM obstacles. Due to their probable limitations in

quantity, it is doubtful that they would be adequate and provide the needed effectiveness and continuity of support to meet the MAGTF's requirement for shaping fires.

In addition to surface fires, the MAGTF also can receive support from aircraft. As mentioned earlier, the MAGTF commander will have control over the helicopters and VSTOL jets operating from the amphibious ships. The aircraft aboard the carrier, with the primary mission of defending the carrier and the fleet, may not be available to the MAGTF commander when additional support is required. The helicopters and the jets possess the capability to deliver potent destructive fires, including an anti-armor capability. Due to aircraft's inherent limitations on time-on-station and weather-dependence, aircraft lack the continuity of support to compensate for the shortfalls of the naval gunfire assets.

As a result, the shortfalls of support caused by the reduction in naval gunfire, both in quantity of ships and quality of guns, can not be compensated for by aircraft and the additional naval surface fire support assets.

The net shortfalls in supporting fires degrade the MAGTF's ability to perform amphibious missions, and therefore remove critical options from the Unified Commanders and the NCA. The insufficiency of the NGF assets' support means that the amphibious forces can not adequately conduct an amphibious assault against an enemy who is prepared and equipped with modern weapons. Additionally, while not precluding their performance of

missions at the lower end of the spectrum such as peacekeeping, NEO's, and stability operations, the lack of adequate naval gunfire places the MAGTF in much higher risk. Given the increase and diversity in United States interests worldwide, and the subsequent reliance on power projection, this degradation of amphibious capability has serious implications for the NCA's options and the attainment of the national security objectives.

## **Chapter 5: Recommendations**

There are a number of changes required to remedy the insufficiency of the naval gunfire assets. First, all of the Navy's surface combatants should be considered potential NSFS platforms, and armed with a large caliber naval rifles. These naval rifles must have the range enabling them to range enemy forces deep inland from as far off shore as the Navy will doctrinally keep their ships.

The naval guns need to be modified to have the capability for "Multiple Round Simultaneous Impact" (MRSI). This capability, as found on the Army's "Crusader" self-propelled artillery weapon, enables a single gun to fire multiple rounds at different trajectories so that they all impact simultaneously.<sup>45</sup> Additionally, these guns must be capable of firing dual purpose improved conventional munitions (DPICM), smoke screening rounds, FASCAM, and high explosives (HE).

The cruisers and destroyers should be armed with the multiple launched rocket system (MLRS), and the NTACMS missile, and these should fall under the commander of the amphibious forces for targeting and control. These ships should also be equipped with a version of the AN/SPY 1 radar modified to serve as a firefinder. Further, the fire control systems for the naval guns and rockets should allow for targeting using the modified AN/SPY-1 radar, as well as UAV's.

Without changes such as these, naval gunfire assets will remain insufficient to support the MAGTF in amphibious operations across the spectrum of conflict. This degradation of capability of the amphibious forces significantly reduces the options available to the CINC's, and jeopardizes their abilities to achieve the United States' national security objectives.

## NOTES

<sup>1</sup> Robert D. Kaplan. The Ends Of the Earth: From Togo to Turkmenistan, From Iran to Cambodia: a Journey to the Frontiers of Anarchy. (New York, NY: Random House, 1996): 17.

<sup>2</sup> U.S. Marine Corps. Concepts and Issues, 1997, (Headquarters United States Marine Corps, Washington DC, 1997), 13.

ssues and concepts, p.13

<sup>3</sup> U.S. President. A National Security Strategy For A New Century. (Washington DC, 1998): 6.

<sup>4</sup> Patrick M. Strain, Amphibious Operations In The 21st Century: A Viable Forced-Entry Capability For The Operational Commander ? MMAS monograph, (School of Advanced Military Studies, Ft Leavenworth, 1993): 7.

<sup>5</sup> Tracy A. Ralphs, "The Troops Ashore Deserve Better Fire Support," United States Naval Institute. Proceedings, (June 1998): 71.

<sup>6</sup> Geoffrey Regan, Great Military Disasters: A Historical Survey of Military Incompetence, ( London, U.K.: B.T. Batsford Ltd., 1987), 159.

<sup>7</sup> Roger J. Spiller, "Not War But Like War": The American Intervention in Lebanon. (Fort Leavenworth, KS: Combat Studies Institute, 1981), 24.

<sup>8</sup> William L. Stearman, "An Interim Solution to the Naval Surface Fire Support Gap." Marine Corps Gazette, ( January, 1998): 61.

<sup>9</sup> National Security Strategy, 26.

<sup>10</sup> Concepts and Issues, 13.

<sup>11</sup> Alan R. Millett, Semper Fidelis: The History of the United States Marine Corps. (New York, NY: The Free Press, 1991):629.

<sup>12</sup> Lawrence A. Yates, Power Pack: U.S. Intervention in the Dominican Republic, 1965-1966. (Fort Leavenworth, KS: Combat Studies Institute, United States Army Command and General Staff College, 1988): 38.

<sup>13</sup> Millett, 558.

<sup>14</sup> Gary H. Wade, Rapid Deployment Logistics: Lebanon, 1958. Research Survey No. 3, (Combat Studies Institute, US Army Command and General Staff College, Ft Leavenworth, 1984): 37.

<sup>15</sup> Robert J. Hanks, American Sea Power and Global Strategy. (New York, NY: International Defense Publishers, 1985): 38.

<sup>16</sup> FMFRP 1-11, p 2-3.

<sup>17</sup> United States Marine Corps, Expeditionary Operations. MCDP-3, (Headquarters United States Marine Corps, Washington, DC, 1998): 73.

<sup>18</sup> James W. Hammond, III, "Relighting the Surface Fire," United States Naval Institute. Proceedings (August, 1997): 28.

<sup>19</sup> Navy Fact File, internet

<sup>20</sup> Naval Weapons systems, Jane's npn

<sup>21</sup> Glenn W. Goodman Jr., "Shipboard Combat Systems," Sea Power, (January 1998): 164.

<sup>22</sup> Tracy A. Ralphs, "The Troops Ashore Deserve Better Fire Support." United States Naval Institute. Proceedings, (June, 1998): 69.

<sup>23</sup> U.S. Navy. Concept for Naval Surface Fire Support., Concept Paper. (Washington, DC, 1997):12.

<sup>24</sup> Samuel L. Morrison, "For Now, Iowa Battleships Still Have a Vital Role." Navy Times, (May, 11, 1998): 7.

<sup>25</sup> Goodman Jr.,167.

<sup>26</sup> E.R. Hooten, ed. 1998. Naval Weapon Systems. (Alexandria, VA: Jane's Information Group Inc, 1998): npn.

<sup>27</sup> Ibid.

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- <sup>28</sup> Joseph M. Lance III, OMFTS: Innovative Concept But Can We Support It With Fires? MMAS monograph, (School of Advanced Military Studies, Ft Leavenworth, 1997): 29.
- <sup>29</sup> Hooten, npn.
- <sup>30</sup> Lance III, 29.
- <sup>31</sup> Hooten, npn.
- <sup>32</sup> Duncan Lennox, ed. Air Launched Weapons, (Alexandria, VA: Jane's Information Group Inc, 1998): npn.
- <sup>33</sup> Hooten, npn.
- <sup>34</sup> Joint Chiefs of Staff. Joint Pub 3-02, Joint Doctrine for Amphibious Operations. (Washington, DC: GPO, 1986): V-8.
- <sup>35</sup> Ibid, VI-4.
- <sup>36</sup> William L. Stearman, "An Interim Solution to the Naval Surface Fire Support Gap." Marine Corps Gazette, ( January, 1998): 71.
- <sup>37</sup> United States Marine Corps, Fire Support in Marine Air-Ground Task Force Operations. FMFM 2-7. (Marine Corps Combat Development Command, Quantico, VA, 1991): 3-6.
- <sup>38</sup> Theodore L. Gatchel, At The Water's Edge. (Annapolis, MD: Naval Institute Press, 1996): 213.
- <sup>39</sup> Michael R. Gordon, and Bernard E. Trainor. The General's War. (Boston, MA: Little, Brown and Company, 1995): 292.
- <sup>40</sup> Anthony, J. Watts, ed. Underwater Warfare Systems, (Alexandria, VA: Jane's Information Group Inc, 1998): 380.
- <sup>41</sup> Stearman., 7.
- <sup>42</sup> David A. Brown, "Navy's Projectiles Strike Enemy Sites Deep Ashore," Signal, (January 1997): 42. The Navy intends to equip Spruance class destroyers, Arleigh Burke class Guided missile destroyers, and some Ticonderoga class guided missile cruisers with the modification to the Mk 45 which would enable it to fire the ERGM.
- <sup>43</sup> Stearman, 73.
- <sup>44</sup> Hooten, npn.
- <sup>45</sup> Hammond, 4.



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## BIBLIOGRAPHY

### Books

Alexander, Joseph H. and Merrill L. Bartlett. Sea Soldiers in the Cold War; Amphibious Warfare, 1945-1991. Annapolis, MD: Naval Institute Press, 1995.

Astor, Gerald. Operation Iceberg. New York, NY: Dell Publishing, Inc., 1995.

Bartlett, Merrill L., editor. Assault From the Sea. Annapolis, MD: Naval Institute Press, 1983.

Bertalanffy, Ludwig von. General System Theory. New York, NY: George Braziller, Inc., 1968.

Clausewitz, Carl von. On War. Edited and translated by Michael Howard and Peter Paret. Princeton, NJ: Princeton University Press, 1976.

Corum, James S. The Luftwaffe. Lawrence, KS: University Press of Kansas, 1997.

Cutler, Thomas J. The Battle of Leyte Gulf. New York, NY: Pocket Books, 1994.

Dorner, Dietrich. The Logic of Failure. New York, NY: Metropolitan Books, 1989.

Drew, Dennis. The Eagle's Talons. Maxwell Air Base, AL: Air University Press, 1988.

Dunnigan, James F. and Albert A. Nofi. Shooting Blanks: War Making That Doesn't Work. New York, NY: William Morrow and Company, Inc., 1991.

Dupuy, Trevor Nevitt. The Evolution of Weapons and Warfare. 1984.

Dyer, George C. The Amphibians Came to Conquer: The Story of Admiral Richmond Kelly Turner. Washington, DC: U.S. Government Printing Office, 1969.

Evans, Michael. Amphibious Operations. McLean, VA: Brassey's Inc., 1990.

Gatchel, Theodore L. At The Water's Edge. Annapolis, MD: Naval Institute Press, 1996.

Gordon, Michael R. and Bernard E. Trainor. The General's War. Boston, MA: Little, Brown and Company, 1995.

Hanks, Robert J. American Sea Power and Global Strategy. New York, NY: International Defense Publishers, 1985.

---

Hastings, Max, and Simon Jenkins. The Battle For The Falkland Islands. New York, NY: W.W. Norton & Company, Inc, 1983.

Heinl Jr., Robert Debs. Soldiers of the Sea. Annapolis, MD: United States Naval Institute Press, 1965.

Hooker, Richard D. Maneuver Warfare; An Anthology. Novato, CA: Presido Press, 1993.

Hooten, E.R. ed. 1998. Naval Weapon Systems. Alexandria, VA: Jane's Information Group Inc, 1998.

Jackson, Paul. ed. 1998. All The World's Aircraft 1998-1999. Alexandria, VA: Jane's Information Group Inc, 1998.

Jomini, Antoine Henri. The Art of War, in Roots of Strategy. Harrisburg, PA: Stackpole Books, 1987.

Kagan, Donald. On the Origins of War, and the Preservation of Peace. New York, NY: Doubleday Publishing, Inc., 1995.

Leckie, Robert. Okinawa: The Last Battle of World War II. New York, NY: Penguin Books, 1995.

Lennox, Duncan ,ed. 1998. Air Launched Weapons. Alexandria, VA: Jane's Information Group Inc, 1998.

Leonard, Roger Ashley. A short Guide to Clausewitz On War. New York, NY: G.P. Putnam's Sons, 1967.

Leonhard, Robert. The Art of Maneuver. Novato, CA: Presido Press, 1991.

Liddell-Hart, B.H. The Rommell Papers. New York, NY: Da Capo Press, Inc., 1953.

Lind, William. Maneuver Warfare Handbook. Boulder, CO: Westview Press, Inc., 1985.

Luttwak, Edward N. Strategy. Cambridge, MA: Harvard University Press, 1987.

Manchester, William. Goodbye Darkness: A Memoir of the Pacific War. New York, NY: Dell Publishing Company, 1979.

Millett, Alan R. Semper Fidelis: The History of the United States Marine Corps. New York, NY: The Free Press, 1991.

Moorehead, Alan. Gallipoli. New York, NY: Ballantine Books, Inc., 1956.

---

Naveh, Shimon. In Pursuit of Military Excellence. Portland, OR: Frank Cass Publishers, 1997.

Regan, Geoffrey. Great Military Disasters: A Historical Survey of Military Incompetence. London, U.K.: B.T. Batsford Ltd., 1987.

Russ, Martin. Line of Departure: Tarawa. Garden City, NY: Doubleday & Company, Inc., 1975.

Sharpe, Richard. ed. 1998. Fighting Ships. Alexandria, VA: Jane's Information Group Inc, 1998.

Spiller, Roger J. "Not War But Like War": The American Intervention in Lebanon. Fort Leavenworth, KS: Combat Studies Institute, 1981.

Till, Geoffrey and Mark J. Grove, and Theo Farrell, . Amphibious Operations: A Collection of Papers. United Kingdom: Strategic and Combat Studies Institute, 1997.

Vagts, Dr. Alfred. Landing Operations: Strategy, Psychology, Tactics, Politics, From Antiquity to 1945. Harrisburg, PA: Military Service Publishing Company, 1946.

Van Creveld, Martin. Command In War. Cambridge, MA: Harvard University Press, 1985.

Watson, Bruce W. and Peter M. Dunn. Military Lessons of the Falklands Islands War. Boulder, CO: Westview Press Inc., 1984.

Watts, Anthony, J. Underwater Warfare Systems, Alexandria, VA: Jane's Information Group Inc, 1998.

Weigley, Rusell F. The American Way of War. Bloomington, IN: Indiana University Press, 1973.

Weinberg, Gerhard L. A World at Arms. Cambridge, MA: Cambridge University Press, 1994.

Yates, Lawrence A. Power Pack: U.S. Intervention in the Dominican Republic, 1965-1966. Fort Leavenworth, KS: Combat Studies Institute, United States Army Command and General Staff College, 1988.

#### Articles

.Anonymous, "Naval Surface Fire Support for the 21st Century." Marine Corps Gazette, (March, 1997) :4.

- 
- Armistead, E. Leigh. "Integrating the Hawkeye into the MACCS", Marine Corps Gazette, (May, 1997):17-20.
- Beddoes, Mark W. "Logistical Implications of Operational Maneuver From the Sea." Naval War College Review, (Autumn, 1997): 32-48.
- Brown, David A. "Navy's Projectiles Strike Enemy Sites Deep Ashore," Signal, (January 1997):41-44.
- Buer, Eric E. "Business As Usual?," United States Naval Institute. Proceedings, (August 1997): 35.
- Canan, James W. "Stealth, Mobility, Survivability," Sea Power ,(April 1997): 65-72.
- DeSantis, Al, and Richard Bayard. "Designing Ships for Marines." Marine Corps Gazette, (March, 1997) :22-24.
- Goodman Jr., Glenn W. "Shipboard Combat Systems," Sea Power, (January 1998): 162-169.
- Gourley, Scott R. "Extending Range to Fight and Win," Sea Power ,(March 1998): 35-37.
- Greenwood, John E. "Perspective on Coming Challenges." Marine Corps Gazette, (November, 1998) :2.
- Hammond, James W. III "Counterbattery From the Sea" United States Naval Institute. Proceedings ,(April, 1998): 30-32.
- \_\_\_\_\_. "Relighting the Surface Fire," ?, United States Naval Institute. Proceedings ,(August, 1997): 26-30.
- Holzer, Robert. "Valuable Lessons Learned-- Arsenal Ship Failure Paves Way For DD-21", Navy Times, Vol 47 no, 21, (March 2, 1998).
- Kennedy, Floyd D. "U.S. Naval Aircraft and Weapons Developments.", United States Naval Institute. Proceedings ,(May, 1997): 122-130.
- Lewis, Leslie and John Scradar, and William L. Swabe, and Roger A. Brown. Joint Warfighting Capabilities (JWCA) Integration, Santa Monica, CA: RAND, 1998.
- Mackenzie, Kenneth F. Jr. "Getting There From Here: The Marine Corps and the 21st Century." Marine Corps Gazette, (June 1995): 34-36.
- Miller, John. "Included In Our Sticker Price': Interview With The Chief of Naval Operations." United States Naval Institute. Proceedings, (March 1997): 6-10.

---

Morrison, Samuel L. "For Now, Iowa Battleships Still Have a Vital Role." Navy Times, (May, 11, 1998): 7-9.

\_\_\_\_\_. "Iowa Class: The Preservation of a Naval Capability," Navy Times, (July, 17, 1995): 11-13.

Morrow, John A. "The Air Land Sea Application Center." Marine Corps Gazette, (June 1997): 36-37.

Ralphs, Tracy A. "The Troops Ashore Deserve Better Fire Support." United States Naval Institute. Proceedings, (June, 1998): 69-72.

Stearman, William L. "An Interim Solution to the Naval Surface Fire Support Gap." Marine Corps Gazette, (January, 1998): 60-62.

\_\_\_\_\_. "What the Marine Corps Really Needs..." United States Naval Institute. Proceedings, (November, 1997): 71-74.

Uhlig, Frank Jr. "The Constants of Naval Warfare." Naval War College Review, (Spring, 1997): 92-105.

#### Monographs and Theses

Bonsall, George. The Impact of Advanced Naval Surface Fire Support on Joint Force Fire Coordination. MMAS monograph, School of Advanced Military Studies, Ft Leavenworth, 1997.

Eggington, Jack B. Ground Maneuver and Air Interdiction: A Matter of Mutual Support at the Operational Level of War. Thesis, School of Advanced Airpower Studies, Air University, May 1993.

Galluch, Paul G. Maneuver Warfare and the U.S. Navy's New Strategic Concept. Thesis, Naval Postgraduate School, Monterey, CA, 1996.

Lance, Joseph M. III. OMFTS: Innovative Concept But Can We Support It With Fires? MMAS monograph, School of Advanced Military Studies, Ft Leavenworth, 1997.

Strain, Patrick M. Amphibious Operations In The 21st Century: A Viable Forced-Entry Capability For The Operational Commander ? MMAS monograph, School of Advanced Military Studies, Ft Leavenworth, 1993.

---

Wade, Gary H. Rapid Deployment Logistics: Lebanon, 1958. Research Survey No. 3, Combat Studies Institute, US Army Command and General Staff College, Ft Leavenworth, 1984.

Wilson, John G. R. An Examination of Naval Surface Fires in Support of Future Amphibious Operations. MMAS monograph, School of Advanced Military Studies, Ft Leavenworth, 1992.

#### Government Documents

Center for Naval Warfare Studies. Expeditionary Power Projection: An Operational Concept for the U.S. Navy Strategic Research Department Washington DC. 1996.

General Accounting Office. Cost Effective Analysis: Naval Surface Fire Support. Washington D.C. 1995.

Joint Chiefs of Staff. Joint Pub 3-02, Joint Doctrine for Amphibious Operations. Washington, DC: GPO, 1986.

Naval Surface Warfare Center. Technical Digest. Naval Surface Warfare Center, Dahlgren Division, Annapolis, MD: 1996.

U.S. Army. FM 6-20 Doctrine for Fire Support. Fort Leavenworth, Kansas: TRADOC, 1996.

\_\_\_\_\_. FM 100-5 Operations. Fort Leavenworth, Kansas: TRADOC, 1993.

U.S. Marine Corps. A Concept For Advanced Expeditionary Fire Support- The System After Next. Marine Corps Combat Development Command, Quantico, VA, 1998.

\_\_\_\_\_. Concepts and Issues, 1997. Headquarters United States Marine Corps, Washington DC, 1997.

\_\_\_\_\_. Expeditionary Operations. MCDP-3. Headquarters United States Marine Corps, Washington, DC, 1998.

\_\_\_\_\_. Fire Support in Marine Air-Ground Task Force Operations. FMFM 2-7. Marine Corps Combat Development Command, Quantico, VA, 1991.

\_\_\_\_\_. Naval Surface Fire Support for Operational Maneuver From the Sea. Marine Corps Combat Development Command, Quantico, VA, 1996.

---

\_\_\_\_\_. Operational Maneuver From the Sea. Concept Paper. Washington DC, 1996.

\_\_\_\_\_. Ship to Objective Maneuver. Concept Paper. Washington DC, 1997.

\_\_\_\_\_. Tactics, FMFM1-3. Headquarters United States Marine Corps, Washington, DC, 1991.

U.S. Navy. Concept for Naval Surface Fire Support, Concept Paper. Washington, DC, 1997.

\_\_\_\_\_. Forward...From The Sea., The Navy Operational Concept. Washington DC, 1997.

\_\_\_\_\_. Forward Presence Essential To American Interests. Department of the Navy Concept Paper, Washington DC, 1998.

\_\_\_\_\_. Gulf of Sabani Crisis Brief, Enterprise Joint Task Force Exercise, Including SOCEX 99-1 (ENT JTFEX). CINCLANTFLT, 18 August 1998.

U.S. President. A National Security Strategy For A New Century. Washington DC, 1998.

#### Electronic Sources

Ralphs, Tracy. "Building a Better Mousetrap: The Iowa Class Battleships."  
<http://www.usnfsa.com/articles/fsao/fsao.htm>; Internet.

Barnett, Roger W. "Expeditionary Power Projection: An Operational Concept For the U. S. Navy. Center of Naval Warfare Studies. [expowpro.htm](http://expowpro.htm) @ [ndcweb.navy.mil](http://ndcweb.navy.mil); Internet.

United States Navy, Naval Doctrine Center. Doctrine Notes. "Naval Fires."  
<http://ndcweb.navy.mil>; Internet.